

BURROW MORPHOLOGY OF FIELD RODENTS¹

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This communication describes the burrow morphology of four species of field rodents, namely *Bandicota bengalensis*, *Mus booduga*, *Millardia meltada* and *Tatera indica* of the cauvery delta, Tamil Nadu. The burrow entrances of *B. bengalensis* had a large quantity of heaped soil and large sized pebbles while those of *M. booduga* had a small quantity of heaped soil with small sized pebbles. The burrows of *M. meltada* went vertically downwards with no soil heap. *T. indica*'s burrows usually had more than one entrance and the burrows were slanted (approximately 45°) with a small quantity of heaped soil. The burrow morphology of rodent species did not vary with the crop fields but the diameter of their burrow entrance was significantly different.

INTRODUCTION

Four species of rodents, namely *Bandicota bengalensis*, *Mus booduga*, *Millardia meltada*, and *Tatera indica* cause extensive damage to paddy and pulses grown in Thanjavur District, Tamil Nadu (Jayaraman and Velayutham 1977, Sivaprakasam 1988). A comprehensive knowledge of the burrow morphology of rodents is useful, since it can be used to distinguish them from other burrowing animals, for population estimation, placing poison baits and also for physical control. The nature of the burrow entrances of field rodents have been reported for *B. bengalensis*, (Barnett and Prakash 1975, Sridhara 1976, Sivaprakasam 1988), *M. booduga* (Sivaprakasam 1988), *M. meltada* (Urs 1968, Sivaprakasam 1988) and *T. indica* (Chandrasah and Krishnaswamy 1974, Barnett and Prakash 1975, Sivaprakasam 1988). No published information on the nature of burrow entrances of field rodents are available from Cauvery delta, Tamil Nadu, and hence the present investigation.

METHODS

The study was carried out in Paddy, Sugarcane, Soyabean, Cotton fields and barren lands

of approximately 2 hectares each in Mannampandal, Kanjanagaram and Natham Villages of Nagapattinam, Quaid-e-Milleth district, Tamil Nadu (11° 2' N and 79° 49' E) during February and March 1993 and April 1994. In the selected crop fields, structure and nature of burrow entrances of field rodents were studied visually and noted down. The available quantity of soil heaps and size of pebbles at the burrow entrances of *B. bengalensis* and *M. booduga* were compared visually. Simultaneously, the diameter of the burrow entrances of field rodents in different crop fields was measured with the help of a divider whose length was read from a calibrated scale and recorded. The difference among the diameter of the four species of rodents were tested statistically by employing Student's "t" test following the method suggested by Sokal and Rohlf (1981).

The plugged (burrow entrance) and unplugged burrows of *B. bengalensis* and *M. booduga* and unplugged burrows of *M. meltada* and *T. indica* were excavated, the animal's presence and absence in the respective burrows were recorded.

RESULTS AND DISCUSSION

Our observations revealed that each rodent species had a typical pattern of burrow entrance. The burrow entrances of the lesser bandicoot rat, *B. bengalensis* had a large quantity of heaped soil with large sized pebbles whereas the Indian field mouse,

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M. booduga's burrow entrances had small quantity of heaped soil with small sized pebbles. Studies of Barnett and Prakash (1975) and Sridhara (1976) also confirm the presence of a heap of soil at the burrow entrances of *B. bengalensis* in Rajasthan and Karnataka, respectively. Similar observations have been made by Sivaprakasam (1988) for *B. bengalensis* and *M. booduga* in Tamil Nadu. Besides, the burrows of both the species were located at the sides of the bunds.

The diameter of the burrow entrances of these two rodent species is another scale for identifying the occupant species. The burrow entrance diameter of *B. bengalensis* (overall range: 4.6 - 7.1 cm) was larger than that of *M. booduga* (overall range: 1.8 - 2.6 cm) (Table 1). The difference between the

burrow entrance diameters of *B. bengalensis* and *M. booduga* is statistically significant ($P < 0.05$, Table 1).

Both the rodent species close their burrow entrances after entering into it. Sridhara (1985) has also reported similar main outlet plugging behaviour of *B. bengalensis* and *M. booduga* either with soil or grass during the day. The observed behaviour of these two rodent pests might be to prevent the entry of predators. In the present study, the number of burrow openings ranged from 1 to 3 for *B. bengalensis* and one for *M. booduga*. In contrast, Sridhara (1985) has observed 5 to 15 openings per burrow for *B. bengalensis*.

To confirm the presence of animals, the closed and open burrows, were excavated. In the closed

TABLE 1

DIAMETER (CM) OF THE BURROW ENTRANCE OF FIELD RODENTS IN DIFFERENT CROP FIELDS OF MANNAMPANDAL, KANJANAGARAM AND NATHAM VILLAGES OF NAGAPATTINAM QUAID-E-MILLETH DISTRICT, TAMILADU

Name of the crop	<i>B. bengalensis</i>		<i>M. booduga</i>		<i>M. meltada</i>		<i>T. indica</i>	
	$\bar{X} \pm S.D.*$	No. of burrow openings	$\bar{X} \pm S.D.*$	No. of burrow openings	$\bar{X} \pm S.D.*$	No. of burrow openings	$\bar{X} \pm S.D.**$	No. of burrow openings
Paddy	5.88 \pm 0.66 (4.6 - 7.1)	1-3	2.14 \pm 0.19a (1.9 - 2.5)	1	3.92 \pm 0.35b,c (3.3 - 4.4)	1-2	—	—
Sugarcane	6.02 \pm 0.59 (5.1 - 7.0)	1-2	2.16 \pm 0.19a (1.9 - 2.5)	1	3.75 \pm 0.34b,c (3.2 - 4.5)	1-2	—	—
Soybean	6.02 \pm 0.58 (5.1 - 7.0)	1-3	2.1 \pm 0.26a (1.8 - 2.5)	1	3.76 \pm 0.35b,c (3.2 - 4.4)	1-2	—	—
Cotton	6.04 \pm 0.52 (5.1 - 6.7)	1-2	2.1 \pm 0.23a (1.8 - 2.6)	1	4.01 \pm 0.19b,c (3.8 - 4.3)	1-2	—	—
Barren land	—	—	—	—	—	—	7.81 \pm 1.05d (6.5 - 10.0)	2-3

* Mean of ten individual observations.

** Mean of fifteen individual observations.

a. Significant difference between the burrow diameters of *B. bengalensis* and *M. booduga*.

b. Significant difference between the burrow diameters of *B. bengalensis* and *M. meltada*.

c. Significant difference between the burrow diameters of *M. meltada* and *M. booduga*.

d. Significant difference between the burrow diameters of *T. indica* and *B. bengalensis*, *M. meltada* and *M. booduga*.

(Student's "t" test at 5% level)

Figures within the parenthesis indicate the range of the respective values.

burrows of *B. bengalensis* and *M. booduga* the animals were present while they were absent in the unplugged burrows (Table 2). Of the 114 closed burrows of *B. bengalensis* excavated, 112 were occupied. On the other hand, of the 52 open burrows of *B. bengalensis* excavated, none was found to be occupied. Similarly, 48 closed burrows of *M. booduga* were excavated, of which 47 burrows were occupied by this rodent species while the examination of 22 open burrows revealed their complete absence (Table 2).

The burrow entrance of soft furred field rat, *M. meltada* was characterised by the absence of a heap of soil and the burrow goes vertically downwards and its entrance remained open. The number of burrow openings per burrow system ranged from one to two. Similar observations have been made for *M. meltada* by Sivaprakasam (1988). Contrary to this, Urs (1968) has observed small stones, pebbles and mud pot pieces around the burrow openings of this rodent species. The burrow entrance diameter of *M. meltada* ranged from 3.2 to 4.5 cm.

The difference between the burrow entrance diameter of *M. meltada* and *B. bengalensis*, *M. booduga* and *T. indica* were statistically significant ($P < 0.05$; Table 1). Seventy nine burrows of *M. meltada* were dug, of which 30 burrows were found occupied (Table 2).

Interestingly, in all the crop fields under study these three species of rodent pests had similar burrow morphology. The diameter of the burrow entrances of *B. bengalensis*, *M. booduga* and *M. meltada* did not vary significantly among the crop fields studied (Table 1). It is also interesting to mention here that burrows of *T. indica* were not observed in the bunds of crop fields.

The Indian gerbil, *T. indica*'s burrows were observed only in the barren lands and they had more than one opening (range: 2 to 3) adjacent to each other and the distance between them was nearly 0.5 to 1.0 m. The burrows were slanted (roughly 45°) and the entrances had a small heap of soil. Our observations of more than one burrow openings are compatible with the observations of Barnett and

TABLE 2
FIELD RODENTS' BURROW OCCUPANCY BASED ON
THE NATURE OF BURROW ENTRANCE IN DIFFERENT
CROP FIELDS

Rodent species	Nature of burrow entrance	No. of burrows excavated	No. of burrows occupied	Percentage of occupation
<i>Bandicota bengalensis</i>	Plugged	114	112	98.0
	Unplugged	52	0	0
<i>Mus booduga</i>	Plugged	48	47	98.0
	Unplugged	22	0	0
<i>Millardia meltada</i>	Unplugged	79	30	38.0
<i>Tatera indica</i>	Unplugged	75	18	24.0

Prakash (1975), Pingale *et al.* (1967), George *et al.* (1982) and Sivaprakasam (1988). The diameter of burrow entrance (overall range: 6.4 - 10.0 cm) was significantly larger than that of the other three species of rodent pests ($P < 0.05$, Table 1). Of the 75 burrows of *T. indica* opened, 18 burrows were occupied by the species.

Thus, from the present study it is inferred that the burrow entrances of the four species of field rodent pests of Cauvery delta are highly species specific. Their burrow morphology did not differ among the crop fields. However, the burrow entrance diameter of four species differed significantly from one another. Further, with the help of these keys one can identify the occupant rodent species under field conditions.

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